

I claim:

1. A system which includes an encoder microchip and a decoder microchip, wherein:

said encoder microchip comprises:

means for storing an identification number,

means for storing a counter value,

means for changing the value of said counter value each time the encoder microchip is operated,

encoding means for performing a nonlinear encoding function on said counter value using said identification number, so as to generate a transmission value,

second means for changing the changed counter value after a given period of time subsequent to the encoder microchip being operated, with the proviso that if the encoder microchip is operated more than once during said given period of time, the counter value is only changed once by the second means for changing; and

said decoder microchip comprises:

means for storing a second identification number,

means for receiving said transmission value from said encoder microchip;

means for performing a decoding function on said transmission value using said second identification number, so as to generate from said transmission value a decoded counter value,

means for storing a second decoded counter value obtained from the decoding of a transmission value of a previous transmission by said means for performing a decoding function;

means for changing the stored second decoded counter value after a period of time subsequent to each time the decoder microchip receives a transmission value; and

means for performing a format scan on signals so as to identify signals conforming to a specific format.

2. An encoder microchip comprising:

means for storing an identification number;

means for storing a counter value;

means for changing the value of said counter value only when the encoder microchip is operated;

encoding means for performing an encoding function on at least said counter value using said identification number, so as to generate a transmission value; and

means for changing the changed counter value after a period of time subsequent to the encoder microchip being operated.

3. A transmitter remote control device, comprising:

an encoder microchip as claimed in claim 2;

means for modulating the transmission value; and

means for transmitting the modulated transmission value to a matched receiver remote control device.

4. A decoder microchip comprising:

first means for storing an identification number;

second means for storing at least a first counter value;

output means;

input means for data;

means for performing a decoding function on the received data using said identification number so as to generate a second counter value;

third means for comparing the second counter value with the first counter value;

activating means for activating the output means, if a comparison carried out by said third means shows that the second counter value is within a defined range of the first counter value;

storage means for storing information relating to said second counter value in the second means if said output is activated; and

means for changing said stored second counter value after a period of time subsequent to storage of said second counter value.

5. A system as recited in claim 4 wherein said means for activating activates said output means when said second counter value is within only a forward range of said first counter value.

6. A decoder microchip according to claim 4, wherein the second storage means stores a plurality of counter values, each being related to a different encoder microchip.

7. A decoder microchip as claimed in claim 4, comprising:

activating means for activating, if a comparison carried out by said third means shows that the second counter value is within a defined range of the first counter value, the output means.

8. A remote control system which comprises a transmitter and a receiver, the transmitter comprising:

first means for storing a first identification number;

second means for storing a counter value which is related to a number of times the transmitter is activated;

means for performing an encoding function on the first identification number and on the counter value so as to generate a transmission value;

means for transmitting the transmission value to the receiver and indicating an activation of the transmitter to a user;

means for changing the stored counter value after a period of time subsequent to transmitter activation;

the receiver comprising:

third means for storing a second identification number which is the same as the first identification number;

means for receiving said transmission value; and

means for performing a decoding function, using the second identification number, on the received transmission value, so as to generate a decoded counter value.

9. A remote control system which comprises a transmitter and a receiver, the transmitter comprising:

first means for storing a first identification number;

second means for storing an encoder counter value;

means for performing an encoding function on at least the first identification number and the encoder counter value so as to generate a transmission value, the encoder counter value being dependent on a number of times the encoding function is performed;

means for transmitting the transmission value to the receiver and indicating an activation of the transmitter to a user;

means for changing the stored encoder counter value after a period of time subsequent to transmission; and

the receiver including:

third means for storing a second identification number which is the same as the first identification number;

means for receiving said transmission value;

means for performing a decoding function, using the second identification number, on the received transmission value, so as to generate at least a decoded counter value that is the same as the encoder counter value;

fourth means for storing the decoded counter value;

means for comparing the decoded counter value to the decoder counter value which is stored in the fourth means and which was generated from a preceding received transmission value;

means for determining whether the decoded counter value falls within a particular range with regard to the decoded counter value;

means for causing a value related to the decoded counter value to be stored in the fourth means if the comparison shows that the decoder counter value is within a said particular range; and

means for changing the value related to the decoded counter value to be stored in the fourth means after a period of time subsequent to the storage of the decoded counter value in said fourth means.

10. A system as recited in claim 9, wherein said means for determining determines whether said decoded counter value is within only a forward range of said decoded counter value stored in said fourth means.

11. An encoder microchip, comprising:

means for storing an identification number,

means for storing a counter value,

means for forming a unit number selected from the group consisting of information representing a command, information representing an input value, information representing a transmitter number and a constant value,

means for changing the value of said counter value each time the encoder microchip is operated,

encoding means for performing an encoding function on said counter value and on said unit number using said identification number, so as to generate a transmission value; and

second means for changing the changing counter value after a period of time subsequent to the generation of a transmission signal, wherein said unit number is modified in relation to a length of time that the encoder is operated.

12. An encoder microchip comprising:

- a counter having a counter value;

- a memory connected to said counter;

- an encoder connected to said counter and said memory for incrementing said counter, for performing an encoding function on said counter value using an identification number stored in said memory and for generating a transmission value; and

- a timing circuit connected to said encoder for timing out a given period of time for said counter to be changed.

13. A decoder microchip comprising:

- a memory having a stored counter value from a previous transmission;

- a input data port;

- a decoder, connected to said memory and said input data port, for performing a decoding function on data received by said input data port using an identification number stored in said memory and for generating a decoded counter value;

- a comparator connected to said decoder and said memory;

- an output circuit;

- an output activation circuit, connected to said comparator and said output circuit, for activating said output circuit, for comparing said decoded counter value to the stored counter value, and for storing said decoded counter value in said



memory, if said decoded counter value is within a defined range of said stored counter value; and

a timing circuit connected to said memory for timing out a given period of time for the stored decoded counter value to be changed.

14. A decoder microchip as recited in claim 13, wherein said output activation circuit activates said output circuit when said decoded counter value is within only a forward range of said stored counter value.

15. An improved encoder microchip of the type used in code hopping systems, wherein the improvement comprises:

means for changing a stored counter value after a period of time subsequent to operation of the encoder microchip.

16. An improved decoder microchip of the type used in code hopping systems, wherein the improvement comprises:

a means for changing a stored counter value after a period of time subsequent to each receipt of a valid transmission value.

17. An improved code hopping system comprising the microchips of claims 15 or 16.